

US-CERN Virtual Visits: Building Transcontinental Connections in High Energy Physics



Julia Gonski, on behalf of the ATLAS & CMS Collaborations,
and the US LHC User's Association

Division of Particles & Fields
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Outline

1. What are Virtual Visits?
2. United States involvement; using VVs as:
 - An educational tool
 - A contribution to pop culture
 - A political advocacy opportunity
3. Future efforts & expansion



A very young audience from **Poland** asking questions during a CMS Virtual Visit



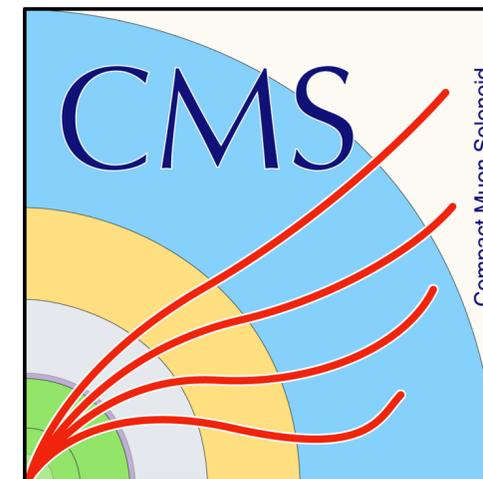
An Iranian scientist guiding a CMS Virtual Visit from **Iran**



Guide answering questions from the ATLAS Control Room

What is a Virtual Visit?

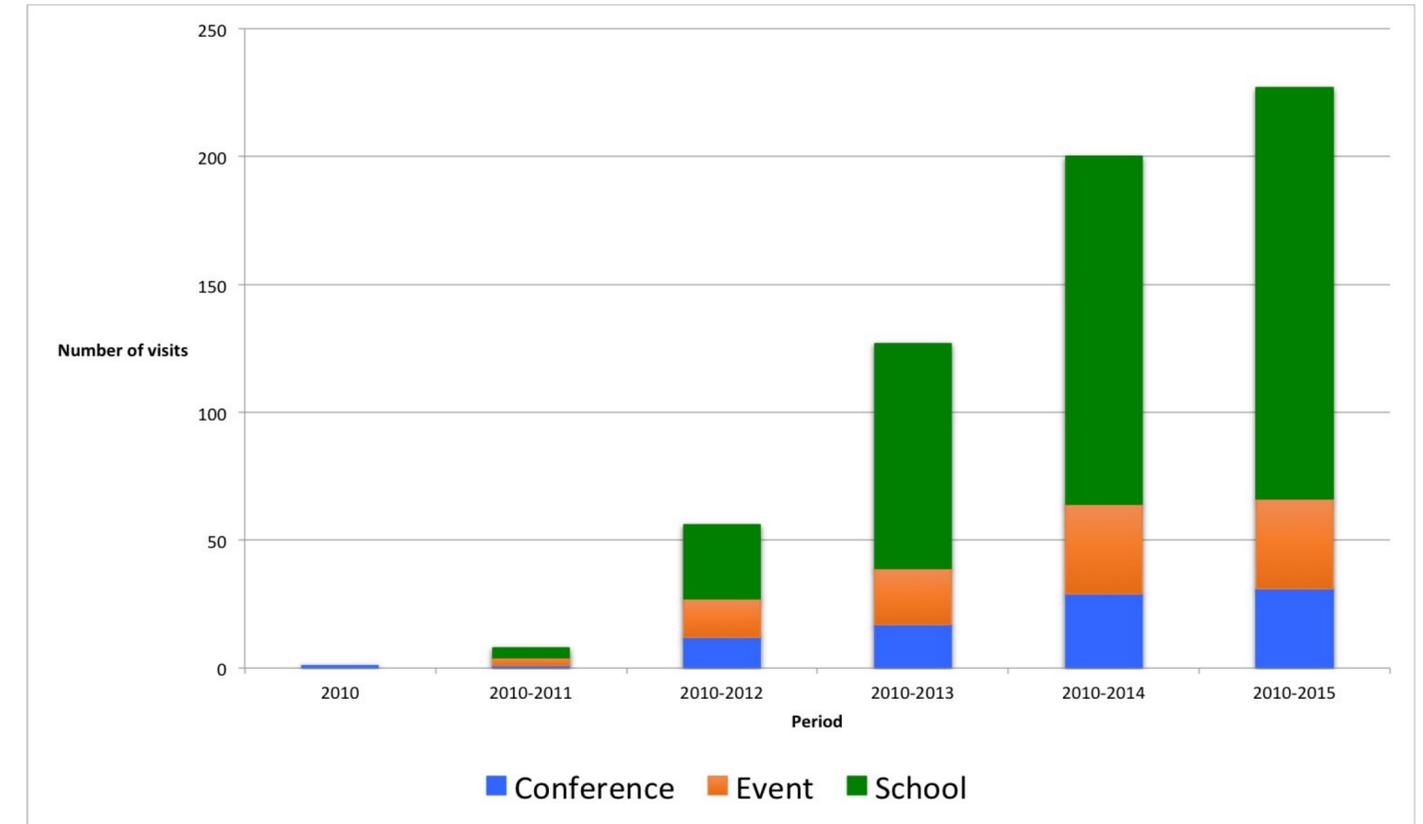
- Live conversation via videoconference, held in participant's preferred language, between physicists from ATLAS/CMS and remote locations around the world
- Provides access to the **ATLAS Control Room** and **CMS Experimental Cavern**
- Over 30,000 people from all seven continents have participated since program launch in 2010



Who Attends a Virtual Visit?



Green: ATLAS Virtual Visits; data from Nov 2010 - July 2015.
Red: CMS Virtual Visits; data from Sept 2014 - July 2015.



Cumulative diagram showing evolution of ATLAS Virtual Visits per type of audience.

In 2017 so far:

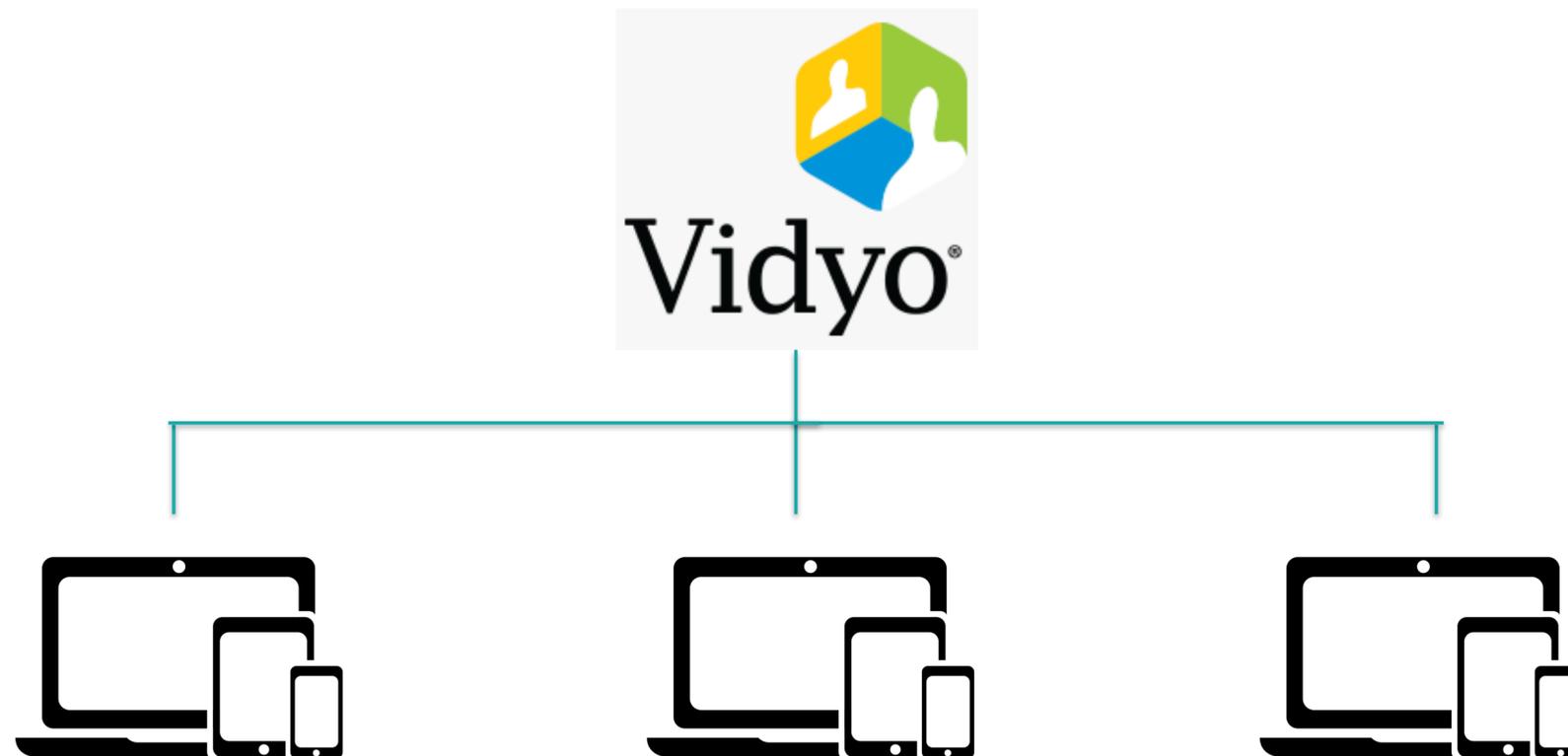
- ATLAS: 28 visits, 4 American
- CMS: 39 visits, 1 American



Great potential for additional US involvement!

Why Virtual Visits?

- **Easy to use:** requires only a device with an internet connection
- **Encourage engagement:** majority of visit is Q&A, exposure to specific role models (female/minority hosts)
- **Versatility:** option to broadcast or publish publicly, advertise on social media, or keep entirely private



Educational Virtual Visits

- Partnership with QuarkNet: masterclasses
- Provides training opportunity for hosts on both ends of the teleconference
- CMS survey: 98% of participants expect that VVs “**will increase the interests of the participants in STEM**”



01. ATLAS

Holy Comforter Episcopal School, Tallahassee, Florida

21 February 2017

J. Gonski



02. ATLAS + LIGO

North Carolina School of Science and Mathematics, Durham NC

23 March 2017

2 August 2017



03. ATLAS

Greenhill School, Addison, Texas

9 May 2017

Broadening Diversity

Remote audience (university students) from **Palestine** during an ATLAS Virtual Visit



- 120,000 in person visits per year —> extend opportunity to various **nationalities, languages, and socioeconomic backgrounds**

- **‘Projecting Particles’** initiative: deepening physics education through media arts for secondary school students in underserved communities
 - Virtual Visit by Steve Goldfarb, 2013
 - Lakota Cosmology festival, 2017
 - Working with Native American & Cuban students



Visits to Alternative Audiences: Pop Culture & Festivals

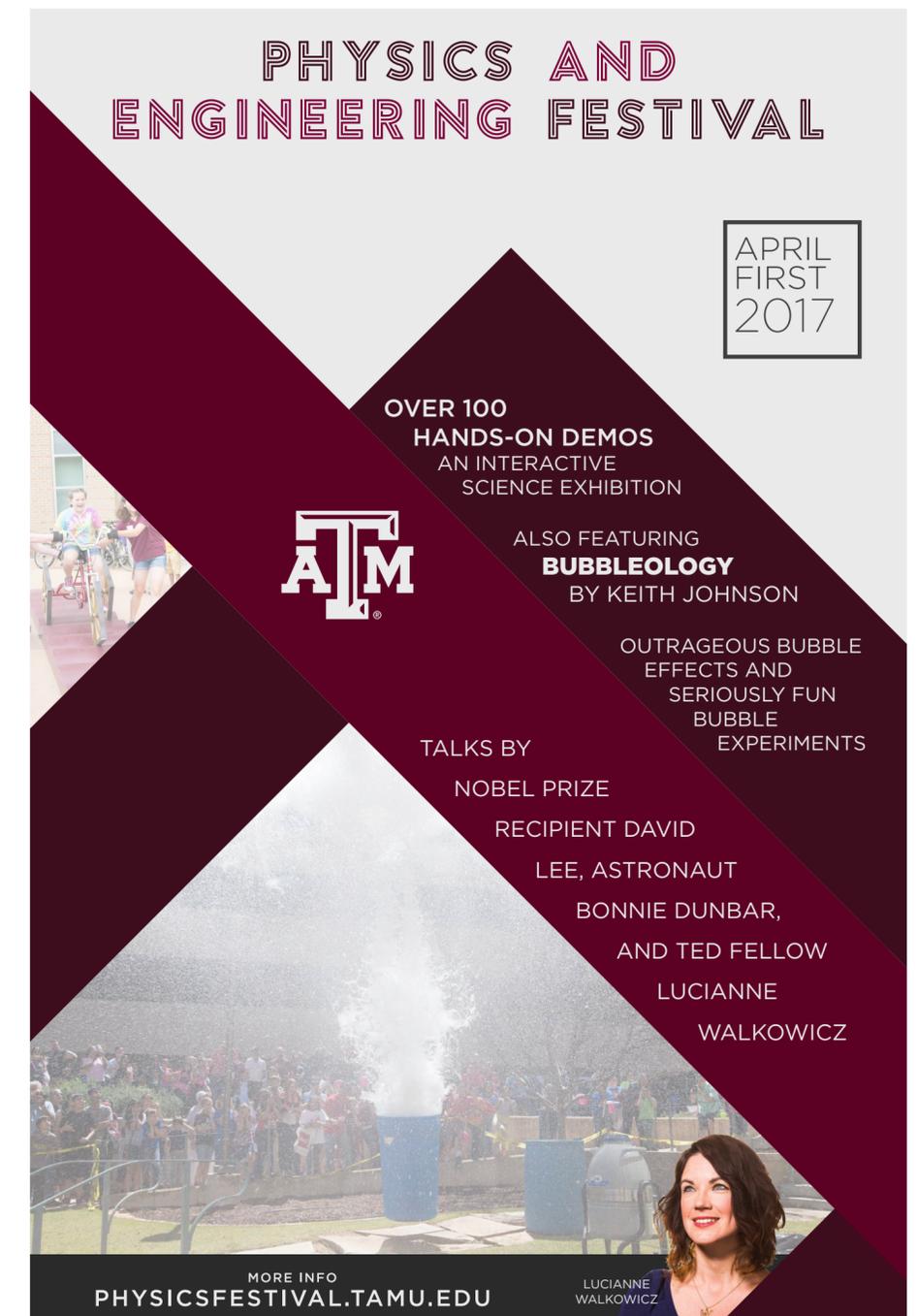
- Science is cool!
- 2017 Festival Visits:

1. Physics Festival at Texas A&M University (CMS)

- April 1 in College Station, Texas

2. Moogfest Music, Art, and Technology Festival (ATLAS)

- May 18-21 in Durham, North Carolina
- Hosted by Mark Kruse, Kate Shaw, Steven Goldfarb





Government and VIP Visits

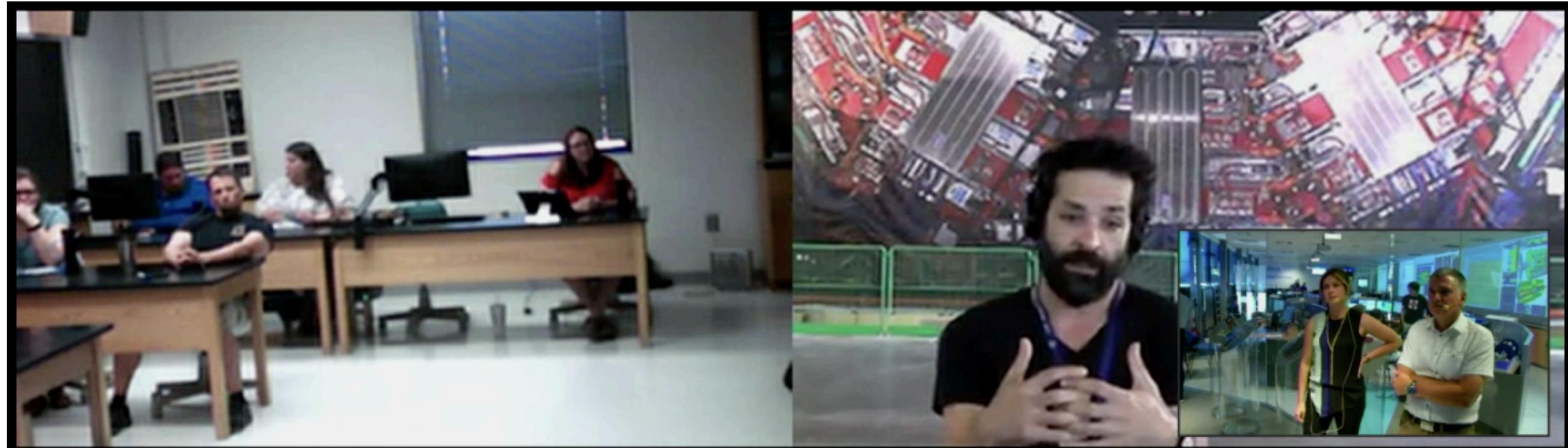
- **Goal:** achieve benefits of in person government visits, while lowering barrier to entry of participation
- Collaboration with **US LHC User's Association:**
 - Serving as ex-officio member of Executive Committee & liaison to APS Council
 - Advertisement distributed on Congressional visit in March 2017



Visit of Caron De Mars, Environment, Science, Technology & Health Counselor, U.S. Embassy, Rome March 2017.

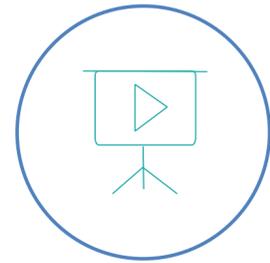


CMS/ATLAS/LIGO Visit to Fort Hays State University



- High school teacher workshop on incorporating modern physics into the classroom
- **Congressional contact:** interest from Sen. Jerry Moran (R-KS) and Rep. Roger Marshall (R-KS)

Conclusions & Future Efforts



American Schools

Expand access for American students in schools across the country



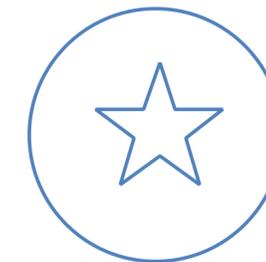
Pop Culture

Continued participation in festivals & other general public appearances, while searching for new opportunities



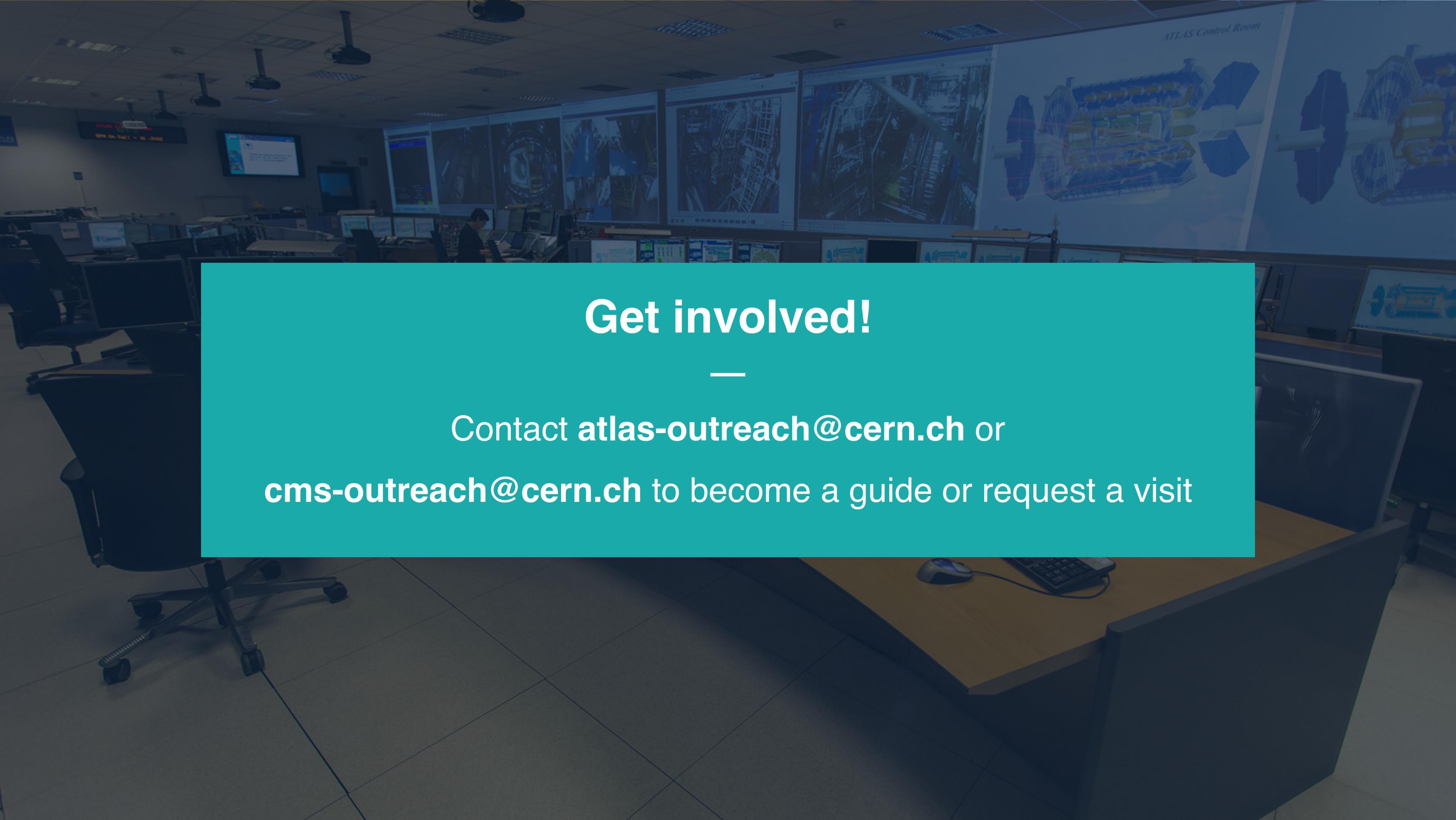
Congress

Engage Congress, either via direct office VVs or from participation in constituency visits



Diversity

Target underrepresented groups (gender, race, socioeconomic status, educational background)

The background image shows the ATLAS Control Room, a large, modern facility with multiple rows of computer workstations and large projection screens displaying technical data and diagrams. The room is dimly lit, with the primary light source being the screens. A person is visible working at a workstation in the middle ground. The text is overlaid on a semi-transparent teal rectangle in the center of the image.

Get involved!

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Contact atlas-outreach@cern.ch or
cms-outreach@cern.ch to become a guide or request a visit

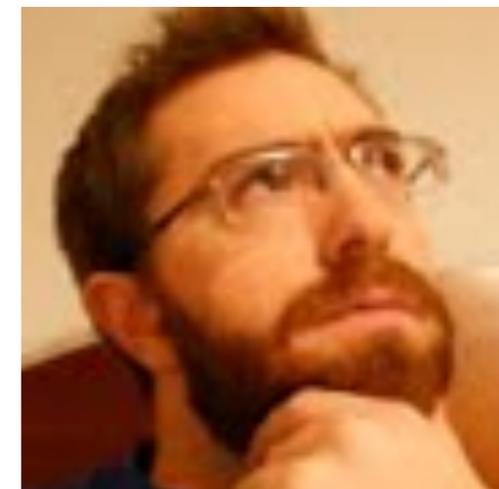
Resources

“ATLAS and CMS Virtual Visits: Bringing Cutting Edge Science into the Classroom and Beyond”. <https://cds.cern.ch/record/2132292>

Future and Past Events:

- ATLAS <http://cern.ch/atlas-virtual-visit>
- CMS <http://cms.cern/engage-with-cms/virtual-visits>

Meet the Team



ATLAS Virtual Visit team:

- Claire Adam Bourdarios
- Steve Goldfarb

CMS Virtual Visit team:

- Marzena Lapka
- Angelos Alexopoulos

American operators:

- Chris Martin
- Julia Gonski

+ many others!